Microprocessor-Based Circular Chart Recorders

CT9000 Series

2 YEAR WARRANTY

Remember to Order Extra Paper and Pens!

CT9144 shown smaller than actual size.

1-, 2-, 3-, or 4-Pen Version
Programmable for 254, 280, or 305 mm (10, 11, or 12") Charts
Accepts Thermocouple, RTD, V, mV, mA, or Switch Signals
40-Character Display
Up to 4 Alarms per Variable
16 Profiles

The CT9000 microprocessor-based circular recorder offers 1 to 4 trends with 1 color per channel. The latter allows future trend addition upgrades and improves chart annotation of times, dates, scale values, trend line tags, and user-configurable real-time actuated chart messages. This instrument can accept up to 8 inputs. Some inputs do not have to be associated with the trend pens (i.e., display only). Up to 4 process values can be displayed at one time on the 40-character vacuum fluorescent display (2 lines of 20 characters each). Full English prompts allow easy configuration. With the recorder's proven dotting head print technology, there is no time difference between trend lines. This feature, along with the straight radial time line (compared with the curved lines on other recorders) allows for more accurate reading of data. The unit uses plain paper charts with pre-printed rings to further enhance readability and provide better long-term storage.

Specifications

General

T/C Accuracy: Typically 1°C (1.8°F)
Chart Accuracy: 0.3% of span
Chart Rotation Accuracy: 0.2 minutes for 24 hours
Ambient Temperature Error: ±0.01% of span per °C (1.8°F) deviation from 25°C (77°F)
Isolation: 500 Vdc/350 Vac
CMR: 120 dB minimum
NMR: 100 dB @ 60 Hz or greater
Scan Rate: 2 scans/s on each input
Operating Temperature: 0 to 50°C (32 to 122°F)
Storage Temperature: -40 to 65°C (-40 to 149°F)
Humidity: 10 to 90% RH, non-condensing
Vibration: 0.3 to 100 Hz @ 0.2 g
Line Voltage: 90 to 264 Vac, 50/60 Hz
Power Consumption: 60 VA max
Enclosure: Gasketed cover, case and window.
NEMA Rating: NEMA 3 (IP54)
Mounting: Panel or optional wall mounting
Mounting Position: Up to 30° forward or backward tilt from vertical; up to 10° side tilt from vertical
Overall Dimensions: 358.65 W x 425.96 H x 196.85 mm D (14.12 x 16.77 x 7.75")
Panel Cutout: 322.58 W x 322.58 mm H (12.7 x 12.7")
Panel Depth: 133.35 mm (5.25")
Panel Protrusion: 63.5 mm (2.5")
Weight: 11.34 kg (25 lb)
Clock Accuracy: 1 min/month typically, 4 min/month worst case
Battery Backup: 5 years minimum, 10 years typically; lithium battery (included)

Operator Interface

Display: 2-line, 40-character VFD with 5 mm (0.21") high characters
Status Indicator: 8 user configurable, red LED status indicator
Keypad: 15 keys for programming and unit operation
Display Formats: 3
Operator Messages: 12
Operator Inputs: 12

Recording

Pen Type: Disposable 4-pen fiber-tip marker assembly
Pen Colors: Red, green, blue, black
Chart Drive: DC stepper motor
Chart Size: Programmable for 10-, 11- or 12-inch charts (12-inch charts are actually 11.875")
Chart Rotation: 6 to 9999 hours per revolution
Recorded Values: Any of over 20 values can be trended/recorded
Recording Methods: Drag pen simulation, instantaneous value, connect the values, average value, connect the averages
Action on New Chart: Print scales and range list, begin normal recording
Chart Messages: 12

Input Ranges

Thermocouple
- **J:** -200 to 1200°C (-328 to 2192°F)
- **K:** -250 to 1370°C (-418 to 2498°F)
- **E:** -250 to 1000°C (-418 to 1832°F)
- **N:** -250 to 1300°C (-418 to 2372°F)
- **T:** -250 to 400°C (-418 to 752°F)
- **R:** 200 to 1700°C (392 to 3092°F)
- **S:** 250 to 1750°C (482 to 3182°F)
- **B:** 200 to 1800°C (392 to 3272°F)
- **G:** 0 to 2300°C (32 to 4172°F)
- **C:** 0 to 2300°C (32 to 4172°F)
- **D:** 0 to 2300°C (32 to 4172°F)

NNM: 0 to 1370°C (32 to 4172°F)
PLATINEL II: 0 to 1400°C (32 to 2552°F)
RTD: -200 to 480°C (-328 to 896°F) 100 Ω platinum with 385 curve 2- or 3-wire, also available with 392 curve or 100 Ω nickel
Volts DC: To 25 mV, 0 to 100 mV, 0 to 1V, 0 to 10V

mA DC: 0 to 20 mA or 4 to 20 mA with internal 50 Ω shunt
Contact Closure:
Open/closed switch sensing without external voltages or resistors
Processing: Square root and exponential functions for linear inputs
Value Cutoff: None, at value, to zero below value, to zero near zero
Measurement Error: ±0.025% of measurement span reference accuracy
Cold-Junction Compensation Accuracy: ±0.2°C @ 25°C (±0.36°F @ 77°F)
Cold-Junction Compensation Rejection:
0.04°/° deviation from 25°C (77°F)
Thermocouple Linearization Error: ±0.25°C (1.45°F) typical, ±0.5°C (0.9°F) worst case with exceptions; RTD: ±0.1°C (0.18°F) typical, ±0.3°C (0.54°F) worst case
Sensor Fault Detection: Sensor break on all T/Cs, RTDs, 1V, 1 to 5V, 4 to 20 mA and mV ranges; sensors high and low on all inputs, 5% above or below range
Sensor Break: Up-scale or down-scale

On/Off Outputs

On/Off Actuators:
Any of over 100 digital values/states can be used to actuate on/off outputs
Relays: SPDT contacts rated 5 A resistive @ 115 Vac
Solid State Relays:
Open-collector output, can provide 40 mA @ 3 Vdc or 20 mA @ 4 Vdc
Pulsed Outputs: 50 ms pulse when used with totalizer pulsed outputs

Current Outputs

Drivers: Any of 20 values can be used to drive analog outputs
Output Span:
To 20 mA or 4 to 20 mA, nominal
Resolution:
12 bits based on 0 to 25.6 mA span
Accuracy: ±0.1% of 20 mA span
Compliance: 650 Ω load
Totalizers:
- **Number:** 4 are included in the option
- **Digits:** 9, displayable with or without commas
- **Types:** Continuous, prelude count down, and pulse counting
- **Presets:** 1 per totalizer

Pulsed Outputs: Fully configurable computing capabilities
Derived Variables: 12
Math Functions: Add, subtract, multiply, divide, average, exponential, log 10, log e, power 10, power e
Built-In Equations: Linear, polynomial, °C to °F, °F to °C, linear mass flow, DP mass flow, BTU, RH, F_O, ZrO_2
Other Functions: High select, low select, high peak, low peak, track and hold, 1 of 2 selector, convert actuator
Custom Curves: Four 20-point curves, usable in multiple calculations

Logic Capabilities

Actuators:
Over 100 digital values are accessible
Derived Actuators:
24 combinations of 24 items
Logic Operators:
NOT, OR, AND, parentheses
Timers: 4
Time/Date Combination Actuators: 6

Alarms

Number: Up to 4 alarms for each of 4 process variables
Type: Process high or low, rate rising or falling
Hysteresis: Fully adjustable

CT9173 shown smaller than actual size.

To Order

Model No.*	Description
CT9111	1-pen, 1-color recorder with 1 input
CT9122	2-pen, 2-color recorder with 2 inputs
CT9133	3-pen, 3-color recorder with 3 inputs
CT9144	4-pen, 4-color recorder with 4 inputs
CT9151	1-pen, 4-color recorder with 1 input
CT9162	2-pen, 4-color recorder with 2 inputs
CT9173	3-pen, 4-color recorder with 3 inputs

Options

Order Suffix	Description
-AL**	2, 4, 6 or 8 relay outputs
-SR**	2, 4, 6 or 8 SSRs
-MA1	One 4 to 20 mA output
-MA2	Two 4 to 20 mA outputs
-MT1	Math (computing and logic capabilities)
-MT2	Totalizer
-MT3	Math and totalizer
-EN3	Plastic window (glass is standard)

*** Total relays and SSRs may not exceed 8.*

Accessories

Model No.	Description
CT9000C-RC-GR	Pen cartridge—green/red
CT9000C-RC-GRB	Pen cartridge—green/red/blue
CT9000C-RC-GRBB	Pen cartridge—green/red/blue/black
CT9000C-12-100	Paper, 305 mm (12"), 100 div. 100 sheets
CT9000C-12-70	Paper, 305 mm (12"), 70 div. 100 sheets
CT9000C-10-100	Paper, 254 mm (10"), 100 div. 100 sheets
CT9000C-11-100	Paper, 280 mm (11"), 100 div. 100 sheets
CT9000-WALL	Wall mounting brackets